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Iberoamerica in Network, GIS & TIC

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Abstract

The paper presents a proposal related to the implementation of an Inter-University Network and Research Centers in the Ibero-American area, related to the management of spatial information using the Techniques of Information Technology and Communications (ICT), where it is proposed as a coordinating center and manager of knowledge to the Technical University of Manabí for having special geographical conditions and professionals with experience in the management of spatial databases and Geoportals. Universities and research centers are a reservoir of knowledge with high potential for the scientific and technical development of society. The Technical University of Manabí in Ecuador is an institution committed to the future of society, which outlines its vision of work in the implementation of projects that allow the use of technical and professional skills of students and teachers. In the current decade, projects are being developed at an international level aimed at strengthening the role of spatial information for the management of sustainable development on a social scale. Geographic information systems (GIS) and computer and communications (TIC) techniques have demonstrated their versatility to be applied to different lines of work and projects.

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Contents

1. Introduction

Since the beginning of the first social manifestations of the human species, the development of group activities was a priority of the first order. Cooperation, integration, and collaboration between human and institutional organizations have been a necessity throughout history for the definition of projects, academic aspects and the development of scientific-technical work.

The management and administration sciences have not been alien to the new perspective and the analysis of social networks in organizations, is currently a management tool, as a new domain of knowledge with which to understand the complex relationships that take place currently in the social world.

But the consideration of social networks as an object of study begins with the anthropological and social essays in the mid-thirties of the twentieth century[1]; In spite of this, the concerns for the progress and outcome of this type of technique were subordinated to the electronic revolution initiated in the 70s, which constituted the starting point for the growing development of the Digital Age.[23,24]

The research developed in the early 1980s allowed the integrated combination of electronics, computing, and telecommunications, enabling remote interconnection between social and institutional groups, first at the national level and then very quickly the internationalization part would come. Although it was initially conceived as a national network, the idea extended to the links with people, organizations, and institutions from other parts of the world and in this way interests would cross international borders. Thus, the criteria of success for an organization began to depend increasingly on their ability to integrate the cooperative exchange in the management of adaptation to technological innovations and the ability to know how to exploit them for their own benefit.[2]

The philosophy of networking in the teaching and scientific profile has been gaining importance in recent years. In this sense, the UbiSalud Network can be taken as reference, which was set up in 2014 by a group of scientists from various Mexican institutions in the areas of health, computing and information technology, with the aim of contributing to prevention, the diagnosis and treatment of noncommunicable diseases (NCDs), such as diabetes, hypertension, obesity and smoking, which together cause the highest morbidity and mortality at the national level.[3]

The UbiSalud Network is a broad organization in terms of the integration of various institutions in the field of health,[29] teaching, and research and is part of the 2014 call for registration and structuring of Thematic Networks of the National Council of Science and Technology (Conacyt) and quickly the interests have crossed the national limits, establishing the

international collaboration with the idea of strengthening it, it has even considered the integration of business organizations in the network.[3]

Other objectives of UbiSalud are: to accelerate the transfer of knowledge of information technologies focused on NCDs and to promote research on the use of information technologies in biomedicine in general and in the area of noncommunicable diseases, seeking to bring population in the shortest possible time what is done in the laboratories. [25, 26]

Since the beginning of the 21st century, a group of universities and research centers from Latin American and Caribbean countries have been developing projects based on information systems with derived spatial data, aimed at facilitating the management of the decision-making process. of energy, environmental, food, agricultural, natural disaster and other sensitive issues to society. The Center for Research, Energy, Environment, and Technology (CIEMAT) of Madrid, Spain, has sponsored in recent years the realization of many of these works. All this has allowed the accumulation of valuable experiences linked to the information society, as well as the use of GIS and ICT, for the solution of complex problems at the social level.[4]

The general objective linked to the articulation of the interuniversity network that is proposed, is focused on unleashing intercampus cooperation and research centers in the Ibero-American area, aimed at promoting the generation of knowledge, which allows to promote technological innovation in the profiles related to the diversification of the energy matrix, the change of the productive matrix, the environmental management and protection, the expansion of the marketable items,[27] the substitution of imports and reinforce the Good Living Awareness of Socialism of the XXI Century facing the Ecuadorian society.[30]

2. Research Method

A bibliographic review is made on the issues related to the organizational networks and information networks, interpreting the various concepts contributed by the authors who have addressed the topic. All this is done in order to reveal the conceptual content that best fits the theme proposed in the work.

At the same time, an exegetical analysis of the emergence and development of organizational and information networks is carried out, extracting the most outstanding experiences where universities and research centers of the Ibero-American area participate. All this in order to arrive at concrete conclusions related to the proposal that contains the work.

3. Results and Analysis

The Technical University of Manabí (UTM) is located in the city of Portoviejo, capital of the province of Manabí, which is considered the foundational territory of the nationality, because in its limits is located the Bay of Caráquez, which in the pre-Columbian era It was the seat of the ancient indigenous city of Carán, and capital of the Kingdom of the Faces, an indigenous territorial entity that is considered the Cradle of the Ecuadorian Livestock, since this site is recognized as the point of arrival of large rafts occupied by the Nación Cara, elements that are affirmed in the literary work the History of the Kingdom of Quito, written by Father Juan de Velasco, which is perhaps one of the oldest texts of Ecuadorian Aboriginal History.[5, 6]

The UTM has located at 1º4'39''.22 degrees south latitude and 80º45'58''.01 degrees west longitude, very close to the center of the planet. This geographical location, the warmth of its climate, the nobility of the Manabi woman and the goodness of man flowed, can favor the conditions for the UTM, host the role of center in the activities of coordination of functions linked to an inter-university network and of research centers at the level of the Ibero-American area.[28]

The UTM was founded by Legislative Decree on October 29, 1952. Its founding objective is the integral formation of the human being so that it contributes to the development of the country and the achievement of social justice, strengthening of the national identity in the pluricultural context of the country. , to the affirmation of democracy, peace, the rights of people and communities, Latin American and global integration, the defense and protection of the environment.[7, 8]

Currently the UTM's mission is to train academics, scientists and professionals responsible, humanistic, ethical and solidarity, committed to the objectives of national development, which contribute to the solution of the country's problems as a university of teaching and research, capable of generating and applying new knowledge, promoting the promotion and dissemination of knowledge and cultures, provided for in the Constitution of the Republic of Ecuador, with a vision focused on becoming a leading university institution, benchmark of higher education in the country, promoting the creation, development, transmission and dissemination of science, technology and culture, with social recognition, regional and global projection.[7, 8] Figure 1 shows the UTM, considering its geographical location, it is in the development phase of several projects that are based on GIS and the philosophy of Geoportals and where it will be the coordinating center of the Ibero-American Geographic Information Network for sustainable development.

Figure 1 The UTM as center of the network

At present, the High House of Studies is deeply committed to the destiny and plans of the nation, focused on achieving the training of professionals who, from their technical way of proceeding, can make the living letter of the political constitution of the Republic a reality, and the challenges posed in the Production Code.

The University is a faithful watchdog of the transparency in administrative management that all state institutions that make up the public sector are obliged to observe, in the terms of article 118 of the political constitution of the republic and other entities indicated in article 1 of the Law itself and which is materialized through the dissemination through an information portal or web page, as well as the necessary means available to the public implemented in the institution itself, on the minimum updated information, which for purposes of this Law is considers it mandatory.[8]

GIS and Ibero-American Integration

It can be said that GIS is a necessary tool in territorial management and planning and since they emerged they constitute a very useful tool in the pre-eminence of GIS lies in the fact that they can manage from small to large territories, in addition to incorporating different analysis topics, which in one way or another are able to relate. One can point to the example related to the 100% renewable strategy studies carried out by Greenpeace, which shows an analysis of the detailed costs for each type of renewable energy source in different regions. These studies were carried out using a GIS as a tool, which integrated different variables to show the solution of a complex problem.[9]

Since the 1990s, the Center for Energy, Environmental and Technological Research (CIEMAT) located in Madrid, Spain, taking advantage of the framework of the JOULE II European Union Research Program, and with the aim of developing a GIS application, capable of to evaluate the regional potential of several types of decentralized electrification systems, proposed the implementation of these tools for regional integration, basing their use for energy planning.[10] This improved experience was later applied to other territories.

Starting in 2007 and under the leadership of CIEMAT, the implementation of IntiGIS in different geographical regions of Latin America began to be developed in a first stage. This institution maintains a line of research for the application of GIS in the regional integration of renewable energies. The projects developed by CIEMAT, as well as the participation of a group of universities from Ibero-American countries and public entities, have shown that regional integration is strongly supported through the use of GIS, so these works have become a reference of pure scientific activity in terms of technological innovation, capable of attracting other institutions and people interested in linking to the subject. In this line, contacts have been very important and have led to training and knowledge transfer projects, as well as the development of national projects.[11]

At present, there is enough experience in Latin America about the use of these tools.

In Colombia MODERGIS is an integrated modeling platform for Sustainable Energy Planning, with the expertise of having presented a case study at the meeting of the Latin American Energy Organization (OLADE) in October 2012, with the slogan "Unites us the energy "[12]; Venezuela and Mexico, despite being oil countries, are committed to the development of renewable technologies and use GIS with the objective of conducting technical-economic feasibility studies, to determine distances, study solar and wind potentials, as well as the location of populations in need;[13] In Argentina, where GIS has been used for the electrification of isolated communities in Chubut;[14] Peru with the PNER GIS;[15] Mexico in particular with the SIGER application;[16] Chile with the CNE;[17] in Costa Rica it has been used for the analysis and projection of the electrical demand of a distribution system for the planning of works;[18] in Brazil the institutional model of the electricity sector has been developed;[19] in Cuba with the SIGFRE [20]; and in Ecuador it has been applied in Ecuador Solar [21],[20] as well as in other applications related to the study of the power electrical system. At present, the UTM has proposed the development of a geographic information system to study the potentials of renewable energy sources and manage their use, as well as the implementation of a Geoportal for environmental management.

In other Latin American countries, even when they have not managed to articulate a specific GIS, they link these tools to the mapping of strategies, mainly associated with the energy profile, such as Honduras, which has set its strategies for the penetration of renewable energies;[22] Nicaragua that performs water management;[23] Panama where a methodology for calculating costs of rural electrification projects is developed;[24] Bolivia where the solar radiation atlas was developed by the Renewable Energy Information Center (CINER).[25] Considering the accumulated experiences of an important group of universities and research centers of Latin American countries, as well as the practical materialization of cooperation relations with the CIEMAT of Spain, in previous years projects have been presented to the CYTED program to materialize an Ibero-American network focused on the application of GIS; but so far the approval benefit has not been obtained.

The work focuses on supporting the proposal to articulate an interuniversity information network and research centers in Ibero-American countries, which can be defined: as a framework of the multiple interactions between the institutions that will be the object of the project and that will take place in the framework of internal and external relations, shaped to model constantly, cooperation in the process of generating data and information related to the production and reproduction of knowledge, as well as the assimilation and adaptation to the abrupt changes that derive from the dynamics of current scientific-technical development.

The argument has been focused on consolidating and expanding cooperation and knowledge transfer among its members, for the development of initiatives aimed at the use of these tools, focused on the drawing of energy and environmental strategies, the solution of social problems and the strengthening of teaching and educational relations, focused on the generation of new knowledge and its generalization.

The approval and conclusion of an Ibero-American integration project, aimed at promoting geographic information focused on the generation of knowledge and the solution of society's problems, can constitute a milestone in the technological innovation of the models and tools that the GIS possess, fostering the generalization of the best experiences obtained in each country,

with relatively low economic costs and resource expenses, contributing in an effective way to improve the quality of territorial planning.

In the approach analyzed above, it will be essential to consider geographic information technologies in three ways: the use of remote sensors for the evaluation of resources and technologies; the development of spatial analysis models based on GIS, which allow multiple variables to be crossed for effective decision making; and the development of Geoportals that give access to the geographic information of resources and facilitate planning.

The UTM, considering its geographical location and which is in the development phase of several projects based on GIS and the philosophy of Geoportals, is offered as the coordinating center of the Ibero-American Geographic Information Network for Sustainable Development. It is important to specify that in terms of the scope of the interuniversity network and research centers of Ibero-American countries proposed, GIS and ICT are called to play a key role for the achievement of the specific objectives that are proposed, among which are can identify the following:

Generation of knowledge derived from the application of novel methodologies to identify opportunities in the use of indigenous resources, based on the generation of energy, the promotion of small industry and to mitigate the insufficiency of basic services (water, food, and energy). Realization of studies focused on territorial ordering, which makes it possible to define the availability of space in terms of the use of resources, the creation of small industries that make possible the diversification and increase of new offerings in the market and the management linked to territorial environmental sustainability.

4. Conclusion

The Ibero-American Geographic Information Network for Sustainable Development proposal will allow the Latin American region to have reliable information during the processes of generating new knowledge and making decisions, generalizing the best international experiences that ensure the sustainable development of society.

The Technical University of Manabí combines its best efforts to the conditions of its geographical location and professional experience in the management of spatial databases, GIS, and Geoportals, to serve as the coordinating institution of the proposed network.

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